

What Is Claimed Is:

- 1 1. A method for generating spatialized audio from non-three-
2 dimensionally aware applications, comprising:
3 intercepting parameters associated with audio use from an application;
4 obtaining location information of a display window associated with the
5 application within a three-dimensional display;
6 calculating an audio source location for the audio; and
7 positioning the audio at the audio source location in a three-dimensional
8 sound space, wherein the audio source location is associated with a location of the
9 display window in the three-dimensional display.
- 1 2. The method of claim 1, wherein intercepting information about
2 audio use involves intercepting an audio stream from the application.
- 1 3. The method of claim 1, wherein intercepting information about
2 audio use involves intercepting parameters associated with an audio stream from
3 the application.
- 1 4. The method of claim 1, wherein obtaining location information of
2 the display window associated with the application involves determining a set of
3 coordinates on the three-dimensional display where the display window is located.
- 1 5. The method of claim 1, wherein calculating the audio source
2 location involves using the location of the display window to calculate
3 coordinates for the audio source location so that audio from the audio source
4 location appears to originate at the location of the display window.

1 6. The method of claim 1, wherein intercepting information about
2 audio use involves inserting wrapper code around an audio application
3 programming interface (API) to intercept calls to the audio API.

1 7. The method of claim 6, wherein the audio API routes intercepted
2 audio information to a three-dimensional window manager.

1 8. The method of claim 7, wherein the three-dimensional window
2 manager manipulates the audio information to position an apparent audio location
3 prior to sending the audio information to code underlying the audio API.

1 9. The method of claim 1, further comprising reducing audio volume
2 of other applications when a given application is issuing a request for a warning
3 tone, wherein reducing audio volume of other applications causes the warning
4 tone from the given application to be predominant.

1 10. The method of claim 1, wherein when a given application is
2 issuing a request for user attention or the three-dimensional window manager
3 decides to get the user's attention to a certain application running in the three-
4 dimensional window, the method further comprises applying spatial audio effects
5 to the audio that the application is generating, wherein the spatial effects include
6 panning the audio source location in the three-dimensional space left and right
7 repeatedly and rapidly.

1 11. A computer-readable storage medium storing instructions that
2 when executed by a computer cause the computer to perform a method for

3 generating spatialized audio from non-three-dimensionally aware applications, the
4 method comprising:
5 intercepting information about audio use from an application;
6 obtaining location information of a display window associated with the
7 application within a three-dimensional display;
8 calculating an audio source location for the audio; and
9 positioning the audio at the audio source location in a three-dimensional
10 sound space, wherein the audio source location is associated with a location of the
11 display window in the three-dimensional display.

1 12. The computer-readable storage medium of claim 11, wherein
2 intercepting information about audio use involves intercepting an audio stream
3 from the application.

1 13. The computer-readable storage medium of claim 11, wherein
2 intercepting parameters associated with audio use involves intercepting
3 information about an audio stream from the application.

1 14. The computer-readable storage medium of claim 11, wherein
2 obtaining location information of the display window associated with the
3 application involves determining a set of coordinates on the three-dimensional
4 display where the display window is located.

1 15. The computer-readable storage medium of claim 11, wherein
2 calculating the audio source location involves using the location of the display
3 window to calculate coordinates for the audio source location so that audio from

4 the audio source location appears to originate at the location of the display
5 window.

1 16. The computer-readable storage medium of claim 11, wherein
2 intercepting information about audio use involves inserting wrapper code around
3 an audio application programming interface (API) to intercept calls to the audio
4 API.

1 17. The computer-readable storage medium of claim 16, wherein the
2 audio API routes intercepted audio information to a three-dimensional window
3 manager.

1 18. The computer-readable storage medium of claim 17, wherein the
2 three-dimensional window manager manipulates the audio information to position
3 an apparent audio location prior to sending the audio information to code
4 underlying the audio API.

1 19. The computer-readable storage medium of claim 11, the method
2 further comprising reducing audio volume of other applications when a given
3 application is issuing a request for a warning tone, wherein reducing audio volume
4 of other applications causes the warning tone from the given application to be
5 predominant.

1 20. The computer-readable storage medium of claim 11, wherein when
2 a given application is issuing a request for user attention or the three-dimensional
3 window manager decides to get the user's attention to a certain application
4 running in the three-dimensional window, the method further comprises applying

5 spatial audio effects to the audio that the application is generating, wherein the
6 spatial effects include panning the audio source location in the three-dimensional
7 space left and right repeatedly and rapidly..

1 21. An apparatus, for generating spatialized audio from non-three-
2 dimensionally aware applications, comprising:
3 an intercepting mechanism configured to intercept parameters associated
4 with audio use from an application;
5 a location obtaining mechanism configured to obtain location information
6 of a display window associated with the application within a three-dimensional
7 display;
8 a calculating mechanism configured to calculate an audio source location
9 for the audio; and
10 a positioning mechanism configured to position the audio at the audio
11 source location in a three-dimensional sound space, wherein the audio source
12 location is associated with a location of the display window in the three-
13 dimensional display.

1 22. The apparatus of claim 21, wherein intercepting information about
2 audio use involves intercepting an audio stream from the application.

1 23. The apparatus of claim 21, wherein intercepting information about
2 audio use involves intercepting parameters associated with an audio stream from
3 the application.

1 24. The apparatus of claim 21, wherein obtaining location information
2 of the display window associated with the application involves determining a set

3 of coordinates on the three-dimensional display where the display window is
4 located.

1 25. The apparatus of claim 21, wherein calculating the audio source
2 location involves using the location of the display window to calculate
3 coordinates for the audio source location so that audio from the audio source
4 location appears to originate at the location of the display window.

1 26. The apparatus of claim 21, wherein intercepting information about
2 audio use involves inserting wrapper code around an audio application
3 programming interface (API) to intercept calls to the audio API.

1 27. The apparatus of claim 26, wherein the audio API routes
2 intercepted audio information to a three-dimensional window manager.

1 28. The apparatus of claim 27, wherein the three-dimensional window
2 manager manipulates the audio information to position an apparent audio location
3 prior to sending the audio information to code underlying the audio API.

1 29. The apparatus of claim 21, further comprising an volume reducing
2 mechanism configured to reduce the audio volume of other applications when a
3 given application is issuing a request for a warning tone, wherein reducing audio
4 volume of other applications causes the warning tone from the given application
5 to be predominant.

1 30. The apparatus of claim 21, wherein the positioning mechanism is
2 further configured to apply spatial audio effects to the audio that the application is

3 generating when a given application is issuing a request for user attention or the
4 three-dimensional window manager decides to get the user's attention to a certain
5 application running in the three-dimensional window, wherein the spatial effects
6 include panning the audio source location in the three-dimensional space left and
7 right repeatedly and rapidly.